

Conversion of Industrial Waste of Pineapple (Peel) into Vinegar by Accelerated Method for Commercialization

Jayasinghe C.V.L.^{a*}, Gunathilake K.D.P.P.^a, Jayasinghe J.M.J.K.^b and Sukirtha S.^c

^a Department of food Science and Technology, Faculty of Livestock, Fisheries and Nutrition, Wayamba University of Sri Lanka, Makandura, Gonawila (NWP), Sri Lanka;

^b Department of Food Science and Technology, Faculty of Applied Sciences, University of Sri Jayewardenepura (WP), Sri Lanka;

^c Department of Biosystems Technology, Faculty of Technology, University of Jaffna, Ariviyal Nagar, Kilinochchi (NP), Sri Lanka

*Corresponding author (email: cvljayasinghe@gmail.com)

Abstract

Pineapple (*Ananas comosus* L.) is a popular fruit among Sri Lankans. The peel (41 % of whole fruit) is usually discarded during its processing, and high amount of sugars in the attached flesh of pineapple peel favorable substrate for fermentation process. The present study was focused in production of pineapple peel vinegar in two modes i.e., development of condiment (3% acetic acid) with spice addition and development of vinegar (4% acetic acid) for commercialization. Mature pineapple (*Anans comosus* L) peel (Mauritius) obtained from a fruit processing industry was used for the study. Spice added condiment was produced by two-step process, i.e., alcoholic and acetic acid fermentation using pineapple peel. Alcoholic fermentation was done in both 25±1°C and room temperature (30±1°C) until the alcohol content reached 9% (w/v). Acetic acid fermentation was carried out with unpasteurized vinegar (*Acetobacteraceti*) with continuous aeration until acid level reached 2% and 3% (in separate batches) followed by pasteurization (72°C, 15 sec) and filtration using muslin cloth. Crushed (0.5-1.0 mm) cardamom and cinnamon were added separately at 1.5 and 2 % (w/v) levels to the above condiments and were aged at room temperature for two weeks. Spiced condiment were obtained by filtration and subjected to sensory evaluation. The best temperature found for alcohol fermentation was 25°C ($P < 0.05$). The 3% acetic acid incorporated with 1.5% of cardamom showed the highest ($P < 0.05$) Total Phenolic Content (4.87±0.03 mg gallic acid equivalent /mL) and Total Flavonoid Content (2.07±0.02 catechin equivalent / mL) and DPPH radical scavenging activity (9.81 µ mol/g ±0.38) followed by 2% of Cinnamon added sample. Sensory panelist were preferred 3% acetic acid incorporated 2% cinnamon >1.5% cardamom. It took 4 weeks for the production of spiced condiment.

Optimization of alcohol fermentation process in the 2nd study was carried out with three-sugar concentration (16, 18 and 22°brix) and three methods of sugar addition (adding sugar at once,